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APPLICANT: Masato Okabe et al.) Group Art Unit: 175i;

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TITLE: Color Filter and Process for Producing the Same

THE COMMISSIONER FOR PATENTS
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AMENDED CLAIMS

1 - 30 (Cancelled)

31. (Previously Presented) A color filter, in which a shading part provided on a border part of a picture element part is not formed, comprising a transparent substrate, a photocatalyst-containing layer formed on the transparent substrate, comprising at least a photocatalyst and a binder, and having a wettability which is changed so that a contact angle with a liquid is reduced by an energy irradiation, and the picture element part being provided on the photocatalyst-containing layer by a pattern of a plurality of colors with an ink jet system; and wherein an ink-repellent convex part is formed on the photocatalyst-containing layer at the border part of the picture element part.

32. (Previously Presented) A color filter, in which a shading part provided on a border part of a picture element part is not formed, comprising a transparent substrate, a picture element part provided on the transparent substrate by a pattern of a plurality of colors with an ink jet system, and a photocatalyst-containing layer formed on the border part of the picture element part comprising at least a photocatalyst and a binder, and having a wettability which is changed so that a contact angle with a liquid is reduced by an energy irradiation.

33. (Previously Presented) The color filter according to Claim 32, wherein the wettability on the transparent substrate is less than 10 degrees in terms of the contact angle with a liquid having the surface tension of 40 mN/m.

34. (Cancelled)

35. (Cancelled)

36. (Currently Amended) The color filter according to Claim 29 Claim 31, wherein the photocatalyst is one or more substances selected from the group consisting of titanium oxide (TiO_2), zinc oxide (ZnO), tin oxide (SnO_2), strontium titanate ($SrTiO_3$), tungsten oxide (WO_3), bismuth oxide (Bi_2O_3) and iron oxide (Fe_2O_3).

37. (Previously Presented) The color filter according to Claim 36, wherein the photocatalyst is titanium oxide (TiO_2).

38. (Previously Presented) The color filter according to Claim 37, wherein the photocatalyst-containing layer contains a fluorine element in a surface of the photocatalyst-containing layer at rate of 5 times more relative to the Ti element as determined by a X-ray photoelectron spectroscopy.

39. (Currently Amended) The color filter according to Claim 29 Claim 31, wherein the binder is organopolysiloxane having a fluoroalkyl group.

40. (Currently Amended) The color filter according to Claim 29 Claim 31, wherein the binder is organopolysiloxane which is a hydrolyzed and condensed compound or co-hydrolyzed and condensed compound of one or more of silicon compounds represented by Y_nSiX (4-n) wherein Y represents alkyl group, fluoroalkyl group, vinyl group, amino group, phenyl group or epoxy group, X represents alkoxy group or halogen, and n is an integer of 0 to 3.

41. (Previously Presented) The color filter according to Claim 40, wherein a silicon compound having a fluoroalkyl group among the silicon compounds constituting the organopolysiloxane is contained at an amount of 0.01 mol% or more.

42. (Currently Amended) The color filter according to Claim 29 Claim 31, wherein a contact angle with a liquid having the surface tension of 40 mN/m on the photocatalyst-containing layer is not less than 10 degrees at a part not irradiated with the energy and less than 10 degrees at a part irradiated with the energy.

43. (Currently Amended) The color filter according to Claim 29 Claim 31, wherein the picture element part colored with an ink jet system is a picture element part colored with an ink jet system using a UV-curing ink.

44. (Currently Amended) A process for producing a The color filter according to Claim 31, in which a shading part provided on a border part of a picture element part is not formed, which comprises:

(1) — a step of providing a photocatalyst-containing layer having a wettability of the energy-irradiated part which changes in a direction of reduction of the contact angle with a liquid, on a transparent substrate;

(2) — a step of forming an exposed part for a picture element part by pattern-irradiating with energy on a picture element part forming portion on which the picture element part, on the photocatalyst-containing layer formed on the transparent substrate, is to be formed; and

(3) — a step of coloring the exposed part for the picture element part with an ink-jet system, to form the picture element part;

wherein the photocatalyst-containing layer contains fluorine and the photocatalyst-containing layer is formed so that the fluorine content in a surface of the photocatalyst-containing layer is reduced by an action of the photocatalyst upon irradiating the photocatalyst-containing photocatalyst containing layer with the energy as compared with before the energy irradiation; and

— wherein the fluorine content in a part in which the fluorine content is reduced by irradiating the photocatalyst-containing layer with the energy is 10 or less relative to 100 of the fluorine content of a part not irradiated with the energy.

45. (Currently Amended) The process for producing a color filter according to Claim 44, wherein the fluorine content in a part in which the fluorine content is reduced by irradiating the photocatalyst-containing layer with the energy is 10 or less relative to 100 of the fluorine content of a part not irradiated with the energy wherein the step of forming the exposed part for the picture element part, then coloring the exposed part with the ink-jet system to form the picture element part, comprises steps:

- (a) — a step of forming a first exposed part for a first picture element part by pattern-irradiating with energy on a part of the picture element part forming portion on which the picture element part, on the photocatalyst-containing layer, is to be formed;
- (b) — a step of forming the first picture element part by coloring the first exposed part for the first picture element part with the ink-jet system;
- (c) — a step of forming a second exposed part for a second picture element part by irradiating with energy on a remaining part of the picture element part forming portion on which the picture element part, on the photocatalyst-containing layer, is to be formed; and
- (d) — a step of forming the second picture element part by coloring the second exposed part for the second picture element part with the ink-jet system.

46. (Previously Presented) A process for producing a color filter, in which a shading part provided on a border part of a picture element part is not formed, which comprises:

- (1) a step of providing a photocatalyst-containing layer having the wettability of the energy-irradiated part which changes in a direction of reduction of the contact angle with a liquid, on a transparent substrate;
- (2) a step of forming an exposed part for an ink-repellent convex part by pattern-irradiating with energy on an ink-repellent convex part forming portion on which the ink-repellent convex part, on the photocatalyst-containing layer formed on the transparent substrate, is to be formed;
- (3) a step of forming the ink-repellent convex part by applying an ink to the exposed part for an ink-repellent convex part;
- (4) a step of forming an exposed part for a picture element part by irradiating with energy on a picture element part forming portion on which the picture element part, on the photocatalyst-containing layer formed on the transparent substrate, is to be formed; and
- (5) a step of coloring the exposed part for the picture element part with an ink jet system, to form the picture element part.

47. (Previously Presented) The process for producing a color filter according to Claim 46, wherein the ink-repellent convex part is formed between the picture element parts.

48. (Previously Presented) A process for producing a color filter, in which a shading part provided on a border part of a picture element part is not formed, which comprises:

- (1) a step of providing a photocatalyst-containing layer having a wettability of an energy-irradiated part which changes in a direction of reduction of a contact angle with a liquid, at the border part of a picture element part forming portion on which the picture element part is to be formed, on a transparent substrate; and
- (2) a step of forming the picture element part on the picture element part forming portion on the transparent substrate.

49. (Previously Amended) The process for producing a color filter according to Claim 48, wherein the wettability on the transparent substrate is less than 10 degrees as the contact angle with a liquid having the surface tension of 40 mN/m.

50. (Cancelled)

51. (Currently Amended) The process for producing a color filter according to ~~Claim 48~~ Claim 46, wherein the contact angle on the photocatalyst-containing layer with a liquid having a surface tension of 40 mN/m is 10 degrees or more at a part not irradiated with the energy and less than 10 degrees at a part irradiated with the energy.
52. (Currently Amended) The process for producing a color filter according to ~~Claim 44~~ Claim 46, wherein the step of coloring the exposed part for the picture element part with the ink jet system uses a UV-curing ink.
53. (Previously Presented) The process for producing a color filter according to Claim 48, wherein the step of coloring the exposed part for the picture element part with the ink jet system uses a UV-curing ink.
54. (Currently Amended) A liquid crystal panel comprising a color filter according to ~~Claim 29~~ Claim 31 and a substrate which are opposite to the color filter, and provided a shading part, wherein a liquid crystal compound is encapsulated between both substrates.